

REMARKS

Applicants are submitting with this response product literature concerning various silica products, as follows:

1. "Reference 1", pages 1-2 of the attached product literature, relates to FUSO Ultra High Purity Colloidal Silica products PL-1, PL-3, PL-7 and PL-20. Reference 1 describes the primary and secondary particle sizes of these products, and provides SEM micrographs showing the product morphology. The ratio of secondary to primary particle size for these products is from 1.7 to 2.7.
2. "Reference 2", page 3 of the attached product literature, relates to Nissan Chemical Industries Snowtex PS-S. Reference 2 is annotated with a partial translation. Snowtex PS-S is the product mentioned in Example 7 of the Otani reference. According to reference 2, the Snowtex PS-S product consists of spherical particles of 10-18 nm linked up into 80-120 nm length chains. This product is outside of the scope of the silica products described in applicant's claims.
3. "Reference 3", page 4 of the attached product literature, relates to Nissan Chemical Industries ST-PS-M colloidal silica, as used in Comparative Sample 2 of this application. Reference 3 is annotated with a partial translation. According to reference 3, this product consists of spherical particles of 18-25 nm linked up into 80-120 nm length chains. The ratio of secondary to primary particle size is therefore at least 3.2 (80/25). This product is outside of the scope of silica products set forth in applicant's claims, but is actually closer to applicant's invention than the Snowtex PS-S product used in Otani example 7. A derivative of this product, which is believed to have the same primary and secondary particle sizes, is described in Comparative Sample 10 of applicant's disclosure.
4. "Reference 4", page 5 of the attached product literature, relates to Nissan Chemical Industries ST-UP colloidal silica, as used in Comparative Samples 6, 9 and 15 of this application. Reference 4 is annotated with a partial translation. According to reference 4, this product consists of a silica sol of elongated shape, having a particle size of 40-100 nm. The ratio of secondary to primary particle size is at least 3.0. This product is

outside of the scope of silica products set forth in applicant's claims, but is closer to applicant's invention than the Snowtex PS-S product used in Otani example 7.

5. "Reference 5", page 6 of the attached product literature, relates to Nissan Chemical Industries ST-30 colloidal silica, as used in Comparative Sample 13 of this application. Reference 5 is annotated with a partial translation. This is a standard type of product that has 10-20 nm, spherical particles. The ratio of secondary to primary particle size is therefore approximately 1. This product is outside of the scope of silica products set forth in applicant's claims, and corresponds closely to the colloidal silica used in Otani Comparative Example 4.

The rejections in this case turn on whether the references, particularly the Otani reference, teaches or suggests to use the particular colloidal silica recited by applicants claims, and, if the references (Otani in particular) teach or suggest this particular colloidal silica, whether the applicants have overcome the *prima facie* rejection.

The attached product literature is being submitted to provide the examiner with more detailed information about various silica products that were used in various experiments in the application and the prior art.

Rejections based on the Kobayashi and Otani references have been made many times now during the examination of this application. It remains the applicant's position that the Otani reference in particular does not teach nor suggest the specific colloidal silica product of applicant's claims, and in addition that the examples in applicant's specification establish unexpected results sufficient to overcome any *prima facie* case of obviousness that might be created by the combination Kobayashi and Otani, taken together with the various secondary references. Rather than reiterate these arguments one more time, applicants respond to the current rejections generally by referring the examiner to applicant's prior submissions, and to the following specific points.

1. The primary and secondary particles sizes stated Otani's paragraph [0020], upon which the examiner relies to support the rejection, quite clearly relates to colloidal silica in

the form of a chain, ring or chain-ring complex, not a peanut-shaped colloidal silica as recited in the applicant's claims.

2. In paragraph 18 of the office action, the examiner cites *In re Boesch and Slaney* for the proposition that a *prima facie* case of obvious may be rebutted where the results of the optimizing variable, which is known to be result-effective, are unexpectedly good. Applicants respectfully submit that the examiner has consistently ignored the underlined portion of the *Boesch and Slaney* rule in this case. The examiner has at no point in this prosecution pointed to any evidence that, within Otani's broad ranges, the selection of a particular geometry (peanut-shaped) or secondary/primary particle size ratio, is known to be result-effective. Applicant's have previously pointed out that (1) Otani makes no distinctions, within his broad teachings, as to geometry and secondary/primary particle size and (2) to the extent that Otani could be read at all to make such a distinction, Otani would suggest that the best results would be obtained by selecting a different colloidal silica than that which the applicants claims require. On this last point, Otani's specific teaching which is closest to applicant's invention is his *Comparative Example 4*, in which the secondary/primary particle ratio is 1.0 (this experiment is comparative not because of the ratio, but because the overall size of the colloidal silica is too small). This experiment is described as a failure because ink absorption color reproduction, cracking, powder and image fastness are all poor (See Table 1). Otani's examples of his invention, in which the secondary/primary ratio is *always* much higher than required in applicant's claims, are said to perform better. This clearly suggests that *very high* secondary/primary particle sizes would be optimum, not the specific (and very low) 1.5-3.0 ratio of the applicant's claims. To reiterate, there is simply no evidence in this case that the secondary/primary particle ratio is results-effective.

3. In paragraph, 19, the examiner rejects the applicant's evidence of unexpected results, on the basis that "Experiments 2, 18 and 19 provide experimental evidence that the claimed properties would be achieved by the combination of [the references], . . ." In other words, the examiner is now saying that if one read the Otani references, *and* made all the specific selections that applicants have made, one would obtain the good results that are achieved with applicants' invention. *This is not and cannot be the proper analysis.* If it

were, there could never be any case in which unexpected results could be established with respect to a narrow range within a wider range that is disclosed in the art. The proper analysis is:

(1) Are the specific selections disclosed in the art? In this case, the answer is clearly “no”, because Otani only discloses wide ranges from which applicant’s ranges cannot be directly derived. In particular, the values listed in paragraphs [0018] and [0020] cannot be manipulated to arrive at a secondary/primary ratio of 1.5, 3.0, or anything in between those numbers. All they do is define a wide range. In particular: $30/5 = 6$; $500/5 = 100$; $200/5 = 40$; $400/5 = 80$; $30/60 = 0.5$ (a physical impossibility), $500/60 = \sim 83$; $200/60 = 3.33$; $400/60 = 6.66$; not a single one of these values falls within the range 1.5-3.0. None of the specific colloidal silicas in Otani’s examples falls within the ratio of 1.5-3.0. Therefore, the applicant’s specific selection is not disclosed by Otani (or any of the other cited art).

(2) If the specific selections are not disclosed in the art, a rebuttable *prima facie* case may exist.

(3) Is there evidence of unexpected results? In this case, the applicants have shown that the selection of the peanut-shaped colloidal silica with the specified secondary/primary particle size ratio yields better results than colloidal silicas having both lower and higher secondary/primary particle size ratio, and better results than colloidal silicas having other morphologies.

(4) Is the variable known to be results-effective? Even if better results are obtained, the results do not overcome the *prima facie* case if the variable is *known* to be results-effective. In this case, the examiner has not shown that the variables (morphology and secondary/primary size ratio) were known to be results-effective. Otani is actually evidence to the contrary.

The examiner is again requested to review MPEP §2144.05.II.B and the cases cited therein for the proper analysis of the patentability of a selection invention.

4. The examiner has one again (in paragraphs 7 and 17) stated that if the applicant’s position is that the results achieved with this invention are not possessed by the prior art, then it would be the office’s position that the application the application contains “inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients”. Clearly, applicants have maintained throughout this prosecution that unexpected properties are obtained with applicant’s invention. As to the

adequacy of applicants' disclosure, it is pointed out that the application includes a great number of examples which not only fall within the scope of the claims but which also provide the unexpected results that applicants have argued. In addition, applicant's specification actually goes on to describe how *not to* get those results, through the selection of different colloidal silicas as shown in the many comparative examples. There can be no serious argument that the applicant's specification is lacking in its disclosure.

The patentability of this invention has been recognized by many other major examining offices, including the patent offices of Europe, Korea, China and Japan. A Notice of Allowance is respectfully requested.

Respectfully submitted,
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